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GEOGRAPHY AND THE WAR IN EUROPE

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TO read the war news from Europe without understanding the geographical features of the Central European countries leaves the story a jumbled and confusing mass of facts without order or meaning. Back of many of the movements of the various armies are the facts of physical geography. To trace the influence of these geographical factors on the war operations is a most illuminating and interesting exercise for a class in geography. For example, what light does geography throw upon the fact that French territory was so quickly invaded by the Germans and Paris itself threatened in the present war similarly as in the Franco-Prussian war of 1870? Why was not Germany invaded by the French and Berlin threatened? On the other hand, why should Germany find her eastern borders invaded by the Russians, in a manner similar to her own invasions of France? Why was the neutrality of Luxembourg and Belgium violated at the very opening of the war but not Holland's? These, and similar questions, are answered, in part at least, by geography.

Distance

One of the important geographical features in the war is distance. In the movement of large armies distance to be traveled is a great consideration. The further an army gets from its home headquarters, the greater becomes the problem of transportation of men, ammunition, artillery and food supplies. Long marches, with much fighting, exhausts men and horses and the efficiency of the fighting force becomes lessened. The further an army penetrates an enemy's country, the greater the danger of flank attacks and the cutting off of lines of communication, and consequently the need of superior numbers to keep the rear of the army protected. Long marches require much time and in modern warfare when striking quickly often means sure victory, time is a very important consideration.

In the war between France and Germany, Germany has the advantage of distance. From Metz, the strongly fortified city of Germany near the French frontier, the distance to Paris is only about 165 miles in a straight line, but from the French frontier to Berlin the shortest distance is approximately 400 miles. The shortest route from Berlin to Paris passes through Aix la

Chapelle, on the Belgian-German frontier, Liege in Belgium, and Maubeuge on the French-Belgium borders. From Aix la Chapelle to Paris is nearly 200 miles, not quite half the distance being across Belgium. From Maubeuge to Berlin, however, the distance is 435 miles. Hence it follows that German armies have considerably less than half the distance to go from their fortified frontier posts to the heart of France, as compared with the distance French troops must go to reach the heart of Germany. Paris is, therefore, simply from the fact of distance, much more subject to attack than Berlin and hence the strenuous effort made by Germany quickly to strike the French capital.

Between Germany and Russia the conditions are reversed. Where the German-Russian boundary line curves westward in Poland the distance from Russian territory to Berlin is 180 miles. Germany's territory comes nearest to Petrograd (St. Petersburg) where the boundary line curves far to the east in East Prussia, but here Petrograd is 420 miles away. Near Thorn on the Vistula River, the main railroad from Berlin to Warsaw and Moscow crosses the boundary 250 miles from Berlin but 780 miles from Moscow. Practically the same conditions exist in regard to Russia and Austria. Vienna is about 225 miles from the Russian frontier near Cracow, while Petrograd is nearly 800 miles from Austria. Judged by distance, therefore, Russia has much the advantage over Germany and Austria for invading the heart of the enemy's country.

Boundaries and Physical Features

The French-German boundary.—The character of the boundaries and the nature of the country along the frontiers determine, to a large degree, the routes taken by invading armies. The western boundary of Germany extends nearly north and south for about 450 miles, one third or 150 miles being with France. The northern half, bordering Holland, is entirely artificial, crossing a flat and open plain, densely settled and covered with a net work of roads, railways and canals. Along Belgium and Luxembourg, the boundary line crosses the dissected plateau of the Ardennes—a rough and wooded region sparsely inhabited. Encircling the northern and western edges of the Ardennes is the Meuse River, which, with its tributary the Sambre, leads from the German frontier across Belgium into France. South of the Ardennes the Moselle skirts the duchy of Luxembourg and offers a route into France. The boundary with France extends from the southern edge of the Ardennes near Longwy across the hilly, but low, plateau of Lorraine to the Vosges Mountains. The high, forested, granite slope of the Vosges continues the boundary southward, and is the most effective natural barrier between the two countries. Several passes cross the range, however, and at the southern end, between the Vosges and the Swiss Jura, a low, wide gateway opens—the Burgundian Gate. So low is this pass that a canal connecting the Rhine and the Rhone crosses it.

The nature of this boundary belt explains the German plan of invasion. A northern army, the Army of the Meuse, followed the route skirting the Ardennes barrier. This is not only the shortest route from Berlin to Paris, but the easiest as far as natural conditions are concerned, and, because of the fertile plain, capable of furnishing large supplies for an army. By leaving German territory near Aix la Chapelle and reaching the Meuse at Liege, Holland's neutrality could be observed, but Belgium must be crossed. Advancing up the Meuse and Sambre through Namur, Charleroi, Maubeuge, La Fere and Givet, low divides, crossed by canals, lead to the headwaters of the Oise and Aisne which continue in a direct line toward Paris.

The Moselle offers a second way of entering France. The army of the Moselle, following up the river to Luxembourg, in order to reach France by the shortest route, must cross Luxembourg territory to Longwy. Hence the invasion of this little country at the beginning of the war.

A third way of reaching France is across the Lorraine Plateau from the Rhine at Strassburg. The Army of the Rhine, following this route along the line of the Rhine-Marne Canal, reached France near Luneville and Nancy. Once through these frontier passes, by whichever route entered, the land becomes lower and more level and the French rivers lead in converging lines upon Paris. An invasion through the Burgundian Gateway is less advantageous. It is far from the heart of Germany, the narrow entrance is easily defended by the great French fortress of Belfort, and it leads, not into the heart of France, but down into the Rhone Valley.

The physical geography of this boundary belt offers much greater obstacles to an invasion of Germany by the French. In the first place, unless a route is followed across the low plains of Belgium and Holland into North Germany, French armies must leave low and open country for the increasingly more rugged and higher lands that lie west of the Rhine. Not only is the advance of an army into such a country difficult, but invaders can be easily repelled. The passes can be heavily guarded. In the second place, the great rivers of Germany lie across the path of invasion toward Berlin, rather than converging upon it. This is especially true of the deep valley of the Rhine, and beyond the Rhine lies the Ems, the Weser and the Elbe.

The Russian-German Boundary.—The Russian-German boundary is a great inverted S-shaped line 700 miles long, with no natural barrier throughout its length. The eastern extension of German territory between Poland and the Baltic exposes that portion to attack by the Russians from three sides, but the western "wedge of Poland points menacingly towards the German capital, and leaves the military strength of Russia free to choose upon what part of the long frontier it will direct the full force of its onset." (Partsch's *Central Europe* — Appleton, New York, p. 334). As the rivers of France converge upon Paris, so the rivers of eastern Germany—

the middle Vistula and Netze, the Warte, the Oder—point toward Berlin. The only natural barrier to the advance of Russian armies is the tangle of swamps and lakes in East Prussia. That the Russians should cross this long open frontier into Germany as soon as their armies had assembled is not surprising.

The same open frontier separates Russia from Austria, and here again Russian invasion of Austrian Galicia was easy of accomplishment. To cross the Carpathian barrier into central Austria-Hungary, however, would be a much more difficult task. But by taking and holding Galicia, Russia would open a possible line of advance for her armies from Poland up the valley of the Oder toward Berlin. To oppose this advance, Germany must depend upon the strength of her arms, unaided by natural factors.

A German invasion of Russia meets many difficulties. In addition to long distances, already mentioned, are the difficulties of poor roads formed by the deep soils of the plains; great stretches of swamp and lake; and the large area that would be necessary to conquer. As the Czar's armies advanced into Germany, they would constantly become more and more concentrated. They go from the large end of a funnel toward the small end. German invading armies must constantly spread out, from the small to the large end of the funnel.

Climate also offers protection to Russia. The long and severely cold winters are more effective than armies or fortifications, and the intensely hot days of summer would be very trying upon an invading army.

Sea Coast and Naval Warfare.—Germany does not need a navy to defend her sea-coast. Nature is her best defense. A low, flat, plain, slightly submerged, the German shore is bordered by very shallow waters, blocked with sand bars. All German seaports are situated far up the mouths of submerged rivers or at the ends of deep bays or "haffs," whose entrances are protected by bay-bars. No port is near enough to the open sea to be bombarded by warships; the narrow, crooked entrances to the rivers and bays are easily protected by land forts and sea-mines; the gently sloping shore line and barrier beaches would make the landing of a large army a slow and difficult task. Hence, the most that an enemy's fleet can do is to blockade the German coast and keep her fleet bottled up in her protected harbors until such time as it will voluntarily come out. No matter how powerful the navy, it cannot harm the German coast nor force the German fleet to open waters. On the other hand, with the aid of the Kiel canal across the neck of the Danish peninsula and the enclosed bays, the German fleet can move along her own coast and concentrate in either the North Sea or Baltic at will. Any general naval battle that may occur between the English and the Germans will be the Germans' own choosing. As long as the English fleet is undefeated, however, Germany must remain cut off from the rest of the world by sea.

THE GERMAN CAMPAIGN IN FRANCE AND BELGIUM

By Lawrence Martin
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Changes in Political Geography

At the end of the third month of the general European War in 1914 a number of features of interest to the geography teacher have been modified. Russia has changed the name of its capital from St. Petersburg to Petrograd, apparently adopting a Slavic rather than a Teutonic form of name because of race prejudice. France and Belgium are temporarily using as capitals the cities of Bordeaux and Havre, respectively, Brussels having been captured by the Germans on August 31st and Paris seriously threatened early in September. The capitol of Servia had been moved from Belgrade to Kragujevatz before the war broke out. Russia invaded the Austrian province of Galicia north of the Carpathians, capturing the strongly fortified city of Lemburg, surrounding Przemysl, and claiming Galicia as a province. Germany occupies Luxembourg and a large part of Belgium. The war on the sea and in the air was less important during the first three months than on land, although aeroplanes were used extensively in scouting. Zeppelin dirigibles dropped a few bombs in Antwerp and aeroplanes dropped bombs in Paris.

Topographic Influences

Interest is centered, however, on the German campaign in France. The geographical factors involved, admittedly with others, in the plan of campaign include the topography of the region between the Paris Basin and the delta of the Rhine. The intervening highland,* which we know (a) west of the broad rift valley of the middle Rhine as the *Vosges* and *Hardt,* (b) in western Germany as the *Rhine Highland,* with its four divisions of Hunsrück, Taunus, Westerwald, and Eifel, and (c) in Luxembourg, Belgium, and France as the *Ardennes,* decreases rapidly in elevation west of the River Meuse. The boundary between France and Belgium lies, not on the low divide in the highland of Artois but a short distance to the north. As is pointed out elsewhere in this magazine, Luxembourg and eastern Belgium are directly on the path from Berlin to Paris. The main German army, however, invaded Belgium near Aix-le-Chapelle or Aachen, crossed the River Meuse at and near Liege, passed through Brussels, and invaded France on

* Among the good descriptions, in English, of the physical geography of the area involved in this campaign are the articles by De Lapparent, Kirchhoff, du Fief, and others in Mill's *International Geography;* Partsch's *Central Europe;* Reclus' France, Germany, and Belgium in volumes II and III of *The Earth and Its Inhabitants;* Chisholm's Europe in Stanford's *Compendium of Geography and Travel;* and Davis's *Rhine Gorge and the Bosphorus* (Journal of Geography, Vol. XI, 1913, pp. 209-215) and *The Seine, the Meuse, and the Moselle* (National Geographic Magazine, Vol. VII, 1898, pp. 189-202, 228-238, and Geographical Essays, pp. 587-616). The latter even includes details concerning the origin of the surface features of some af the battlefields. See also *Paris sheet,* Nord M31, International Map of the World on the scale of 1:1,000,000.

the portion of its frontier west of the Ardennes. Here topography clearly played a part, for it was easier to cross the French frontier in Belgium than in the hilly Ardennes to the east. It seems possible that the development of the modern siege gun may have much to do with the control of routes of invasion by topography and by roads in the future. A sixteen-inch gun, such as the Germans are reported to be using, must be drawn by 30 to 40 horses or by a powerful traction engine. If the army using these guns is to advance with rapidity the route must not involve rough country or poor roads. West of the River Meuse and its tributary the Sambre, the German army found the favorable topography and good roads they desired. To the east in the Ardennes such rapid progress would have been impossible, as the three chief valleys were guarded by the French fortresses of Maubeuge, Givet, and Longwy, which the invaders did not wish to take time to capture, although each of them has subsequently fallen into the hands of the German armies, due to the secret development of remarkably large siege guns.

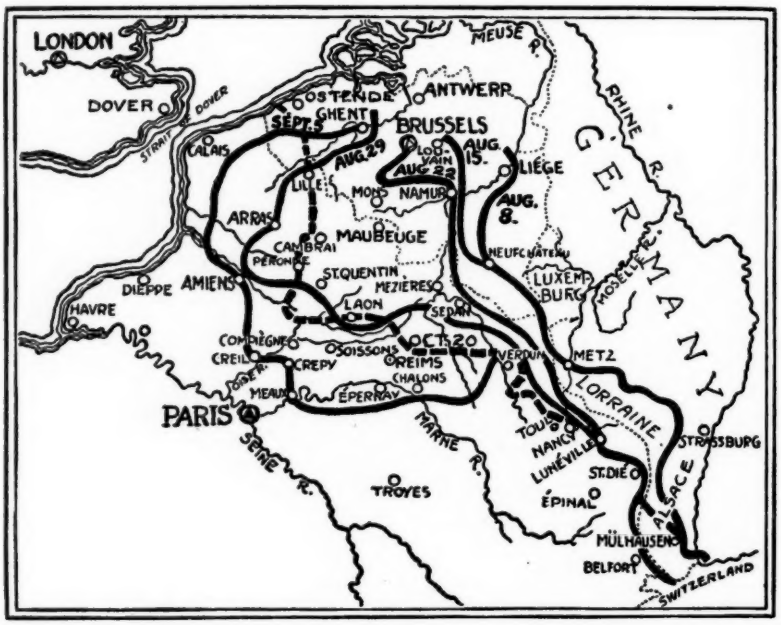

Fig. 1. Successive areas occupied by the German armies invading France. Lines drawn at intervals of a week. Modified from a map (Copyright, 1914) by the *New York Evening Post*. Line of battle Oct. 20th shown by a dashed line.

Invasion Moving Down Stream

The rapidity of the German invasion of France is unparalleled. As is shown in Fig. 1 the Germans passed Liege about August 8th. They occupied a small area in Belgium near Louvain and Namur on August 22nd. During the following week they spread out into northern France, so that August 29th saw them at Lille, Arras, St. Quentin, Laon, and near Verdun.

In a week this tremendous force moved southward about 85 miles, in the face of a stubborn, retreating force of allied French and English soldiers. The topography favored this advance through the valley of the Oise, but the loss of German soldiers was tremendous.

The advance through the Paris Basin during the following week, was no less remarkable. Figure 1 shows the German line on September 5th. It extends west to within 45 miles of the English Channel at Calais. It extends south beyond Epernay, Chalons, and nearly to Verdun. Moreover in the valleys of the Marne and Oise it reaches Meaux and Creil which are less than 30 miles from Paris. Meaux is within 23 miles of the walls of Paris, though there are strong forts between. The advance during this week is over 50 miles, as from Laon to Meaux. Topography is again favor-

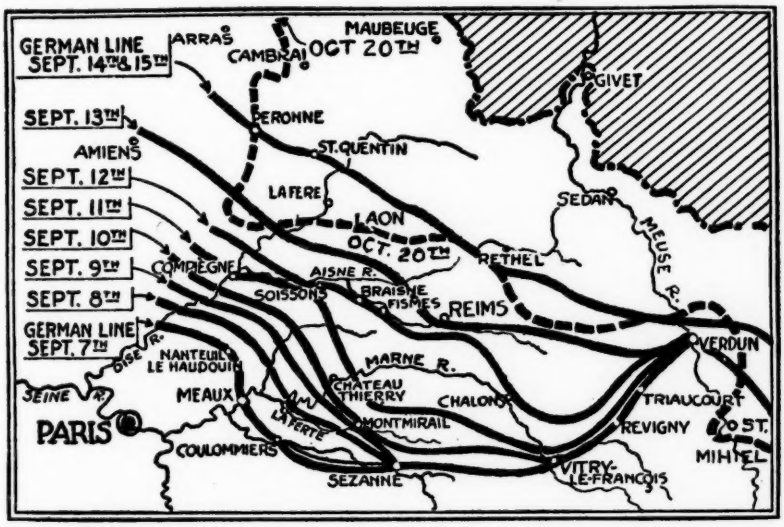

Fig. 2. Map showing successive positions of the allied French and British armies in driving the Germans back from Paris. Lines drawn for each day up to the time of the great battle north of the Aisne. Modified from a map in the *New York Sun*.

able, but the difficulty has increased with the distance from base of supplies, with the larger area occupied, and with the reinforcement of the French and English armies.

Retreat of Germans Across Hilly Country

The rapidity with which the Allies drove the Germans back is even more remarkable. Figure 2 shows the successive positions of the armies every day for the week September 7th to 14th. When the Germans turned away from their movement directly on Paris on September 3rd and went southeastward to try to break through the Allies' center, we see the be-

ginning of failure of the German campaign in France. The Allies' center held. Moreover the French and English rapidly drove back the Germans through the series of positions shown in Figure 2. This is all the more remarkable when we consider the topographic situation, although the German forces were weakened by (a) loss of men during the Allies' retreat and (b) diversion of troops to the Russian frontier. The topography favored the Germans. They were retreating northeastward. This part of the Paris Basin is a belted plain with ridges running north and south, the escarpments facing eastward and the cuestas sloping westward. The cuesta in the Champaign district near the Allies' center is crossed by the rivers Marne, Aisne, and many tributaries. The deeply-cut valleys of these rivers formed natural lines of defence for the retreating Germans. They were driven across the Marne; but they intrenched themselves north of the Aisne, whose narrow, gorge-like valley is 200 to 300 feet deep. Here the line held from September 15th to October 20th. The great battle which was waged for over a month resulted in little advances here, little retreats there, but no notable change. Between September 7th and 14th the Allies drove the Germans back about 60 miles, or to essentially the same position they held on August 29th (Fig. 1). The topographic grain of the country, better developed near Reims than to the northwest, enabled the Germans to hold essentially the same position from September 15th to October 20th, for the valleys and escarpments enabled each force to just about balance the other. No flanking movement dislodged the Germans from their position north of the Aisne. But with the aid of their enormous new siege guns they reduced the forts around Antwerp, occupying that city October 9th and Ostende a week later. Both of these cities had been used as temporary capitals of Belgium. On October 20th the right wing of the German army rested upon the coast of the English Channel between Ostende and Dunkirk faced by the French, Belgians, and British. This necessitates a break somewhere in the line of battle which extends continuously from the English Channel to Switzerland. Topographic conditions favor a change on the plain near the sea in Flanders rather than in the hilly region to the southeast in the Ardennes-Vosges.

A NEW DECLARATION OF INDEPENDENCE

THE United States Geological Survey has just published a most timely paper on Our Mineral Reserves (Bull. U. S. Geol. Survey No. 599, 1914, 48 pp.). This bulletin, compiled by the Director, George Otis Smith, shows how nearly complete is the independence of this country in regard to raw mineral materials. The list of necessary mineral products which we cannot provide consists only of the fertilizers, potash and the nitrates, and the metals, nickel, tin and platinum.

The author predicts a great development of our mineral resources, both because of the demands of the rest of the world for our products since their European markets are closed by war and also since the needs of our home markets will force the exploitation of many hither-to neglected deposits.

Dealing first with the subject of mineral fuels, it is shown that since the six countries which rank next to us in coal production are at war, the United States must inevitably find a large export trade waiting for its coal. This country possesses nearly twice as much coal as exists in all Europe, and shortage need not be feared. The great European market for our petroleum is closed, and no advance can be expected in this industry.

In regard to the mining and manufacture of our metals, conditions may be briefly summarized as follows: The importation of ores of iron, lead, zinc and radium will not be affected. Aluminum ores will decrease about ten per cent and those of platinum and manganese will be so scarce as to greatly hamper industries dependent on these metals. The supply, and therefore the cost, in our local markets of manufactures of iron, lead, zinc, copper and radium will not be reduced; in fact, with the exception of iron, our production of these metals must be curtailed.

There will be some shortage of arsenic and aluminum, a considerable deficiency in the supply of tin and antimony, but the most serious situation will be in the platinum and manganese markets. Our manganese deposits will be developed to meet this demand quite easily, but we have no important platinum resources. Probably enough for technical and mechanical purposes can be secured from Russia, if the supply is not diverted to the jewelry trade. Of our exports, iron and zinc should show a great increase, while copper and radium will have practically no foreign markets.

Of the miscellaneous minerals and their products, the only ones not found at least in part in this country are potash salts and diamonds. In spite of the careful and wide-spread search carried on by the Survey for a decade, there is still no known deposit of available potash in this country. The world's commercial supply of potash comes entirely from Germany, and is cut off by the war. We use potash in fertilizers, in the manufacture of glass, of soaps, certain bleaching chemicals, dyestuffs, some explosives, etc. Nitrates for chemical purposes are recovered from gas and coke plants and our phosphate reserves are the greatest in the world. The supplies of other mineral chemicals are adequate for all our needs, but we are decidedly delinquent in the use of our coal-tar and petroleum by-products.

In short, the United States is not only the world's greatest producer of mineral wealth, but possesses greater reserves of most of the essential minerals than any other nation. Probably no other nation in the world so nearly approaches absolute independence in respect to mineral resources.

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SIBERIA

By Leonard O. Packard
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THE region to which the name Siberia is now applied extends from the Ural Mountains on the west to the Pacific Ocean on the east. The boundary on the north is the Arctic Ocean; and on the south it is a line running from the source of the Ural River to the Tarbagatai Mountains, thence along the Chinese frontier as far as the southeast corner of Transbaikalia, and then along the rivers Argun, Amur, and Ussuri to the Korean border. Siberia may be considered as consisting of two parts, Western Siberia which includes the basins of the Ob and Irtysh Rivers, and Eastern Siberia, the remainder of the region.

As one traces these boundaries one cannot fail to be impressed by the vast area included within them, and at once begins to wonder to what extent this great area is adapted to human activities. At the present time the region does not exert a great influence outside its own limits. In the past it has played an important part in the history of both Europe and Asia. In early times its boundless plains offered unequalled opportunities for nomadic tribes to push their way from several eastern centers into western Russia, and indeed into all Europe, thus determining in no small measure the racial and cultural characteristics which are found in the invaded regions at the present time. The same levelness of surface made it easy at a later period for Russian explorers to forge their way rapidly eastward to the Pacific Ocean, where need of open harbors brought the Russian people into conflict with China and Japan.

But the service which Siberia is to render in the future will be quite different from that of the past. Instead of serving merely as a highway for the passage of wandering peoples the country promises to become one of the most important food producing areas of the world. Before Siberia can gain such a rating among the civilized and industrial nations of the world she must show resources commensurate in some measure at least with her great size; and these resources must be efficiently developed.

That Siberia possesses these resources, and that they are to some extent appreciated, is shown by the increase in population in recent years. The population of the region in 1910 was 8,219,020. Since 1897 the population of the Russian Empire has increased 31 per cent, the population of Siberia in the same time having increased 40 per cent. This increase in population is due chiefly to immigration from European Russia. The larger land holdings which it is possible for the immigrant to secure offer great inducement. In European Russia the average peasant can obtain only about five acres of land which serves to occupy his time for only a portion of the year. In Siberia the holdings are sufficiently large to require his attention for the whole of the

year and thus to yield him a better living. In western Siberia the population is widely scattered, while in eastern Siberia it is confined mainly to the chief roads and rivers.

The chief occupation of the people is agriculture, an industry dependent upon surface, soil, and climate.

As to surface Siberia presents considerable diversity. In the north and west the country consists mainly of a vast plain, while in the east and south plateaus and mountain ranges occur. In some parts of the western plain the surface is so nearly level that the water drains into the headwaters of one stream when the wind is in a certain direction, and flows into another stream when the wind is from the opposite quarter. This condition prevails near the source of the Lena and the Yenesei. Because of this exceedingly level surface of the western plain and resulting poor drainage, much of the land in this portion of Siberia is swampy and unfit for agriculture.

The western portion of the Siberian plain passes toward the East into rolling prairie land similar to that of the Canadian Northwest. Some of the prairie lands are exceedingly fertile, those of the Upper Yenesei equalling in fertility the Red River Valley. Other portions are rocky and so unfit for farming. Because of the rocky lands, the swamps, and the thousands of acres yet to be cleared of forests, millions of acres cannot be cultivated. Then, too, it must be remembered that a large part of the country is still unexplored. The parts best known lie not far from the main streams and the railroads. Large areas well adapted to agriculture are as yet unsettled simply because of lack of adequate transportation facilities.

The climate of Siberia compares favorably with that of Canada. Since the rain-bearing westerly winds are here far from their source of supply the rainfall is more or less precarious. According as the rainfall is much or little the crops are heavy or light, in some seasons being three times as heavy as in others.

As in Canada under similar conditions of soil and climate the chief crop is wheat, though rye and oats are also grown to a considerable extent.

Poppy culture for the production of opium and oil has increased in importance for several years. The climate of the Ussuri district is particularly favorable to the cultivation of this plant. This industry is entirely in the hands of the Chinese who rent the land of Russian land holders. The area under cultivation in the eastern coast region rose from 826 acres in 1910 to 9,450 acres in 1912. Recently a bill to prohibit opium-poppy growing has been introduced into the Russian Duma. The injurious effects of the industry is felt not only because of the use of opium, but because continued cultivation of the poppy exhausts the soil, thus rendering the raising of food crops unprofitable.

One might expect that on the vast plains of Siberia cattle raising would be a very important occupation. This is not the case however, as the Russian

farmer has apparently failed to meet modern conditions. He cannot compete with Australian meat products even in his home markets.

Although cattle are not raised in large numbers for meat products the country produces large quantities of milk and butter. Milk is an important article of diet throughout the country. An interesting adaptation to the extreme cold of winter is shown in the method of handling milk during that season. The milk is allowed to freeze in shallow pans. After a hole is cut in the center of each cake they are threaded on strings and thus carried to market or to customers. According to the Russion Year Book, butter constitutes Siberia's chief export. Because of its quality, which is constantly improving, it is now competing successfully with products of Europe and Australia. In 1913 the shipment of butter amounted to 173 million pounds. The butter is purchased at centers in Siberia and exported through foreign firms. The new American tariff which reduced the duty on butter from six cents to two and a half cents per pound opens a new market. A number of firms in Siberia are already supplying the American trade.

Another important product of the country is lumber. The industry of lumbering is confined, however, almost wholly to supplying local needs. Very little inroad has been made upon the forests in Eastern Siberia except along the Ussuri and its immediate neighborhood. No well organized lumber industry exists in the Far East, largely because of the restrictions imposed by the Russian Government to whom practically all of the forest lands belong. Another handicap is the difficulty of communication and transportation in these regions. The small amount of lumber exported is sent to Japan, China, Australia and some even to western Europe. As the industry becomes organized it is believed that the forest of the Amur River Basin will be an important factor in the world's timber supply. Doubtless pulp mills will be established, as much of the wood is suitable for making pulp. As has been suggested already much of the forest land of Eastern Siberia has not yet been explored. It is estimated that altogether Siberia possesses about 217 million acres of timberland. There is no other country which equals the Russian Empire in the extent of such lands.

As might be expected these vast forests are inhabited by many animals which are valuable for their furs. As the lumber industry increases, however, the fur industry decreases because of the reduction in the size of forest areas. Another reason for the decrease in the number of fur bearing animals is the lack of restrictions on hunting. Amazing numbers of pelts are sold at the fairs held annually throughout Russia. Nearly all Siberian furs are sold at the Irbit fair. According to consular reports for 1911 there were sold at this fair, besides other furs, four and one-half million squirrel skins, a half million rabbit skins, twelve thousand sable, two hundred thousand brown bear, sixteen thousand five hundred fox, one hundred eighty thousand weasel, and sixteen thousand five hundred gray wolf skins. The Russian government

has become alarmed at the rapid decrease in the number of sable and has passed a law prohibiting the killing of the animal or the buying, selling or exporting of sable furs for three years. The best sable skins sell for more than $200 each.

The only article of commercial value supplied by the cold tundras of the North is the ivory obtained from tusks of fossil Siberian mammoths. These fossil animals have furnished the Chinese with ivory for more than seven hundred years. At the present time from 500 to 650 hundredweight of mammoth tusks are found annually in the government of Yakoutsk. Small quantities are used by the inhabitants for carving, the remainder goes to Moscow and the European markets.

Siberia is also rich in minerals. The larger part of the gold and silver of Russia is obtained from this part of the Empire. All gold must pass through the government laboratories and thence to the mints of St. Petersburg. The chief gold producing regions are in Transbaikalia and in the vicinity of the Amur and Olekma rivers. The important silver deposits are found in the Altai region.

Coal is found in many places in Siberia. The coal deposits are large and promise much in the way of the future development of the country. At the present time, however, owing to the lack of transportation facilities, what little coal is mined is used only for home consumption. Mines are worked to a considerable extent near Vladivostok but there it is of poor quality. The most promising source of coal is Sakhalin where rich deposits exist. The great obstacle to the development of these deposits is the absence of good harbors on the western shore of the island where the coal is found in greatest abundance. In the towns and cities of Siberia wood is still used extensively for fuel but is becoming dearer each year, in many places being more expensive than in St. Petersburg. Hence the demand for coal is steadily increasing. With improved methods of production and increased transportation facilities the prices would be reduced and the consumption thereby increased.

Fishing is an important industry in certain parts of Siberia. About one-half of the trade in fish is in herring. The fisheries of the Amur River region are the most important of the Far East. This importance is due not only to the size of the industry but also to the fact that fish is the staple article of food of the native and Russian population. The salmon stands first and the sturgeon second in importance.

In addition to the river fisheries an abundance of fish occurs off the Pacific coast. From May to October all kinds of fish, including salmon, cod and herring abound in the waters around the peninsula of Kamchatka. It is said they are present in such quantities that after a severe storm the shores are covered with fish to a depth of five or six feet. Fish going up river are an impediment to vessels. The fishing industry off Kamchatka is largely controlled by the Japanese. The growth of the industry in eastern

Siberia in recent years is due to the aggressiveness of the Japanese, and also to the fact that, as many of the European fish stations have become exhausted, the unexploited waters of the Far East have attracted fishermen from the White, Black, and Caspian Seas. There has been little in the way of export in the past, but the transportation of frozen fish from this region to European Russia seems now to be firmly established.

The industries of Siberia are chiefly agriculture, lumbering, mining, and fishing. Manufacturing is not carried on to any considerable extent although the milling of flour is an industry of some importance. Blagoweshtchensk in the Amur Province ranks third among the milling towns in the Russion Empire. The milling of lumber, the brewing of beer, and the making of brick and cement constitute the other more important manufacturing industries. These articles are used almost entirely for home consumption. The one thing needed above all others to improve conditions in all branches of industry in the country is improved transportation facilities. The Trans-Siberian Railroad helps greatly in this direction, but it must be realized that this road can reach but a very small fraction of Siberia. The great problem is of course the long distance which both imports and exports must be shipped. Transportation within the country itself assists in the support of transportation lines less than one would expect for the reason that uniformity of surface, climate, etc., gives similar products and so little need for exchange.

In spite of all obstacles, however, progress is being made in the way of improved transportation. A branch of the Trans-Siberian Railroad is being constructed along the north bank of the Amur River. This road will be extended to Nikolaiefsk on the Pacific coast, thus providing a railway across Asia lying entirely in Russian territory. In addition to extension of railways, plans are being considered whereby it may be possible to convey products by canals, lakes, and rivers entirely across the Russian Empire from the Pacific coast to St. Petersburg.

A country so greatly handicapped in all her other industries as is Siberia could hardly be expected to carry on an extensive foreign trade. Her chief exports are grains and dairy products. Some lumber, fish, and oil seeds are also sent to other countries. Imports consist in large measure of manufactured articles of many kinds. America sends large quantities of agricultural machinery, sewing machines, and articles used in railway construction.

On the whole, Siberia's resources are large; consequently her future possibilities are great. A most important need is wise and sympathetic governmental control. Thus, greater enlightenment on the part of the inhabitants themselves, aided by foreign capital and enterprise, will give to Siberia her full measure of prosperity.

CONSTRUCTION MATERIAL OF CITIES

By Frederick Homburg, Cincinnati, Ohio.

OF all cities, ancient or modern, none has been as thoroughly studied as ancient Rome. The archaeologist has extended and supplemented the work of the historian, and has given us valuable information regarding Roman structures and monuments. We are now able to state of what the buildings, the walls and the streets of Rome were composed; and we cannot but marvel at the extent to which the neighborhood of Rome facilitated the building of the Eternal City. History might have been written otherwise had the strata of Rome been different; certainly Roman geology gave Roman genius an opportunity. There was clay for the making of brick and tile, and plenty of sand and material for lime, so that substantial buildings of brick and mortar could be erected. Nearby was also found a volcanic ash called pozzuolana, from which hydraulic cement was made. Good building stone was plentiful; for example a volcanic tuff known as peperino, also called Alban stone; and travertine, a porous light yellow calc-sinter. Travertine is an excellent building stone inasmuch as it is easily worked when just quarried, and as it hardens on exposure. We find it used in such buildings as the Coliseum of ancient days, St. Peter's of medieval times, and the modern Palace of Justice. In the days of the empire, when the provinces had to bear the burden of beautifying the chief city, the Romans became fastidious and called for expensive marble and other valuable rock not found in the vicinity; and in those days, freight boats, laden with building material from afar, helped with craft carrying other merchandise to almost choke the port of Ostia.

In the days of the republic, and as late as the early empire, Rome with its narrow winding streets and irregular construction was not particularly beautiful, but under Nero a new Rome sprang phoenix-like from the ashes of the old, and after that every Roman had reason to be proud of the appearance of his native place. The building mania of the imperators infected private men of means, and each tried to outdo his predecessor. Even later writers could say that there was nothing grander under the sun than the city of Rome, that no eye could compass its magnitude, no mind its beauty, no mouth its praise. In the third century an Arabian eulogist of Rome compared the state of those that had not viewed the great city with that of the blind who do not know the sun; and one of the later Christians from Africa at first sight of the Eternal City cried out: "How beautiful must be the heavenly Jerusalem, if this earthly Rome shines with such magnificence." Such was its extent that there was a saying: "In whatever part you happen to be, you are still in the midst." Looking down from the capitol on the vast expanse of houses, the great numbers of temples, palaces, colonnades, plazas with public buildings, theaters and baths, alternating with the fresh verdure of parks and gardens, the sight must have been indescribable. When in the year 357 the emperor

Constantius for the first time beheld Rome, he was speechless with wonder and admiration; he was dazzled by the crowding together of so much that was beautiful, and at each new sight it seemed to him that that must be the greatest and grandest of all. And where is all this beauty? An organism from which life has departed is decomposed and the parts are utilized in other combinations; and this has been the fate of the dead cities of antiquity. So stupendous were the ruins of old Rome, that they became veritable stone quarries for later generations; and costly material was torn from its place to be incorporated in the walls of some humble structure. Just as Memphis, the capital of ancient Egypt had to furnish the material for building Cairo, so the Coliseum, the palaces and baths of the Caesars were exploited by medieval Rome; and medieval ignorance and bigotry worked faster than time to destroy or inflict deplorable damage on the proofs of the civilization of the past. Religious fanaticisms of the early Moslems and Christians must have had something to do with this vandalism, and irreplaceable marbles, monuments of surpassing beauty were dumped into the kiln to be turned into lime.

The imposing ruins of the great cities of antiquity may lead to the mistaken notion that they were always and uniformly built of enduring substance. Whenever wood is available,—and it usually was in new settlements, ancient or modern,—it will be used because of its low cost, abundant supply, cheapness of transport, rapidity and ease of construction. Ancient cities like modern ones grew only gradually to be composed of stone; hence if old sites could later on be ruthlessly treated as artificial quarries, it is because they represent the final stages of old cities, and whatever was perishable had passed away. The celebrated colonnades of Greek temples, composed of the far-famed Doric, Ionic and Corinthian pillars, are believed to have been evolved from the tree-trunks that supported the tops of the early temples of wood. Past the middle of the first century, Rome was still largely constructed of wood; and that accounts for the awful catastrophe of the year 64. An inconsiderable blaze at the south-east corner of the circus spread to the neighboring booths, a high wind fanned the flames and drove them into the narrow quarters between the Palatine and the Capitoline, then up the hills and down into the vales beyond, so that when night fell, the red sky announced to dwellers afar off the destruction of the mistress of the world. Six days and nights the devouring element raged, and when the panic-stricken people thought it was quelled, it rose again and left fully two-thirds of the city a smouldering heap. With Rome as ruler of the world, the great fire proved a blessing in disguise; there was, indeed, much immediate suffering, but the enormous cost of rebuilding was laid upon the provinces, and Greece and Asia had to sacrifice their treasures of art to adorn the metropolis on the Tiber. A far-seeing plan of reconstruction was adopted: the streets were made wider, plazas were established, the number of fountains was increased, building material was prescribed to prevent recurrence of disaster, and by example, by prizes and by

subsidies a building craze was nurtured that gave Rome a title to the praises so lavishly bestowed.

For great conflagrations there is a cause and a condition: the drought and high winds of 1871 would not have turned the burning of a shack into the great Chicago fire, had not Chicago had so many wood buildings, wood side-walks and even wood-paved streets. Just as the emperors could say they found Rome a city of brick and wood and left it a city of marble, so the Chicagoans could boast that the fire found Chicago a city of wood and left it one of stone.

In Russia wood is the chief structural material. Now the initial cost of wood buildings is lower than more lasting ones; but when one considers the fact that Russian and Siberian towns in consequence of decay and fire are rebuilt every 20 or 30 years, it seems very doubtful that wood is cheapest in the long run. In 1812, the great fire of Moscow, started by patriotic Russians to compel Napoleon to retire, would not have consumed four-fifths of the city, had not the houses with but few exceptions been built of wood.

In both America and Australia the tendency of pioneer days to use wood still exists in spite of the greatly increased price. Wood is so convenient; all parts of a house may be prepared and numbered at the mill; a mere beginner can put up a frame house. In 1849 when adventurers from all lands flocked to the California gold fields, San Francisco quickly grew to be a city composed of factory-made frame houses; and as a result, in 1850, it was wiped out by fire three times in quick succession.

Were it not for the danger from fire, much might be said in favor of wood construction. Contrast the home-like appearance of a wood-built town, with the dreary aspect, the stifling monotony of mining towns built of corrugated sheet iron, such as are found in various parts of the United States and South Africa. It has been the fashion in our country to build at resorts monster hotels, all of wood, and very pretentious in appearance. Such a hotel was the "Inside Inn" an enormous wood structure erected on the World's Fair Grounds at St. Louis at the time of the Louisiana Purchase Exposition. It was conveniently and practically built; there were 4,000 rooms, 6,000 beds and plenty of fire-escapes; all passed off well, yet what terrible chances the thousands of guests took, that came and went each day. Prevention is better than cure. It has been calculated that the first cost of a fire-proof building is about 15 per cent higher than that of the dangerous kind, and that the durability and the reduction in repair and in insurance premiums,—if such should be deemed necessary,—would wipe out this difference in a few years.

Incombustible material is, however, not necessarily safe. Of course stone will not burn; but the various forms of calcium carbonate, such as limestone, travertine, marble, etc., are decomposed when strongly heated, are turned into lime, and crumble. Ordinary mortar, too, is, after exposure

composed in part of calcium carbonate; hence the danger of collapse of brick walls during or after a fire. More resistant stone, such as granite and sandstone, when strongly heated in a conflagration and then struck by water will crack; this in fact, was the method of getting through stubborn rock masses in the days before blasting agents were employed. Steel is a very modern building material; we see such framework of tall structures in our large cities, standing out like metal skeletons against the sky. Now while steel or iron will not burn in air nor be easily melted, such buildings cannot be pronounced safe unless the surroundings are; strong heat will cause expansion and pushing out, still stronger heat will weaken the carrying power of the girders and cause bending and with its enormous load a structure cannot stand the strain.

It is evident that our safety depends on the safety of our neighbors. It has been suggested that buildings be labelled safe or dangerous and that the latter be taxed more heavily; this, it is claimed, would not be unjust in view of the fact that, as a public danger, such structures add greatly to the city's expenditure. If all buildings were safe there would be no chance for conflagrations. The term "safe" and "fire-proof" are not synonymous; the first may be relative. Material to be fire-proof must not only be incombustible but must remain practically unchanged by fire. One good effect of the rise in price of wood is that it is increasingly turning attention to Portland cement construction. Portland cement is made by grinding and mixing and heating the materials (which are essentially limestone and clay or marl) and then powdering the resulting mass. The resulting yellowish green powder, when moistened, hardens in air or under water without change of volume, and becomes stone-like. It is not usually applied by itself, but in erecting buildings of what is commonly called ferro-concrete. You see board columns with twisted steel rods in the midst. Into these boxes and around the rods is filled the concrete, made by mixing and moistening crushed rock or pebbles and cement. On Sunday morning, Feb. 7, 1904, fire broke out in Baltimore which raged for thirty hours and was stopped in consequence of a fortunate shifting of the wind. Just after Apr. 18, 1906 the whole country was shocked by the news that San Francisco was ruined by an earthquake and that the ruins were in flames. A valuable lesson was drawn from these terrible disasters; experts examined the affected districts in both cities, and their conclusion was that the concrete structures were not only most fire-proof but also most resistant to earthquake shocks.

BUILDING MATERIAL IN THE UNITED STATES

Between 1890 and 1912 the amount of Portland cement produced in the United States increased from 350,000 to 83,350,000 barrels. In 1909 wood was used in only 27.5 per cent of building materials in 128 of our leading cities. Brick buildings made up 61.49 per cent of the total construction by cost. Wood is still much used in small town and country construction. [From Salisbury, Barrows, and Tower's *Elements of Geography*.].

THE PURPOSES OF GEOGRAPHY TEACHING

By Richard Elwood Dodge
Teachers College, Columbia University, New York City

IN these days when it is becoming increasingly possible, by simple tests, to measure progress in teaching, the question naturally arises as to the ways in which progress can be measured in such a time-honored subject as geography. This is a pertinent and a perplexing subject,—pertinent because efficiency should be a test applied to all school subjects, and perplexing because geography, from its nature, does not permit the application of efficiency tests as readily as subjects like arithmetic, spelling, drawing, etc., that can be readily divided into a number of sub-units in each of which certain definite standards can be set.

We cannot measure progress unless we know where we are going—the goal which we must reach in the end. There is no general agreement as yet as to the objects of school geography study, either from the standpoint of knowledge, or the ability of the learners to use their knowledge in the seeking of more knowledge, or in the interpretation of every day affairs.

The first stage, therefore, in any serious effort to measure geography work in schools is to agree on certain general standards as to the aim of the work. Then we can shape our course toward the goal in order that our progress each year or day may be measured in the proper perspective of the problem as a whole.

When we can divide our course, not into certain years of work, but into certain definite steps, each of which ought to develop certain abilities and powers, then we can apply tests that will measure progress in each sub-unit.

A teacher knowing the ends of her work and the powers her pupils should display at the beginning and the end of the year, can really do something, and not be merely helping turn the endless treadmill of daily monotony, which has characterized school geography so much in the past.

The first step, therefore, is to agree on certain desirable ends to be attained, and then to question oneself as to how much each year's work is contributing toward the attainment of those ends. The methods employed must of course be reviewed in any such seeking after ideals. The too common practices of question and answer, of memory work and recitation, reveal themselves at once as incomplete methods of work. Training in how to study and use geography is more vital than a knowledge of the facts of geography.

Is it worth while to memorize the capes and peninsulas, to drill on the location of mountains and inconsequential rivers, or is it more worth while to teach the significance of these features in the human life of a locality, and to permit the location knowledge to come out chiefly through this larger study?

Is it worth while to hear recitations from a closed text book, or is it more worth while to have the maps and text before the pupils and to show them how to get the permanent things out of their study?

Is it worth while to illustrate the common features of the earth from some distant land, or is it more worth while to make the home locally significant as a geographic area that is replete with geographic relationship?

Is it worth while to make pupils think that geography is a perfect subject and the text book the last word on the subject, or is it more worth while to show them that geography is a vital, growing subject and that its problems will be of significance all their lives?

Is it worth while to require every pupil to repeat a certain phraseology, sentence by sentence, or is it more worth while to have him tell a story and illustrate it by his own most natural means of expression?

Is it worth while to test pupils' knowledge of fact by making them draw a map from memory, thereby impressing upon their minds error, or is it more worth while to give them a good base map and ask them to express their knowledge on that?

These are only a few of the problems that geography teaching brings up; some of them dealing with methods of daily practice, others, and the more fundamental, involving a consideration of the whole problem of geography teaching.

Until we can agree on the ends most worth while, and the best means of reaching those ends, it is unfair to measure a teacher's or pupil's progress by personal standards or ideals. A superintendent or critic who takes a teacher to task for not pronouncing Missouri or Himalaya according to his personal and often inaccurate standards, and yet who will praise a clock work recitation, with questions and answers ticked off in perfect time, has much yet to learn as to the real end and purpose of geography teaching, and is not using the correct tests.

We all desire improvement in geography teaching; we have vague images of ideals which we would like to reach. Can we not agree on these desirable ideals, and then work on the means that should be employed to reach these ends, with the least waste of energy? Then we will be in a position to test by proper standards our work of the day and year. At present the tests we apply have no standard values. They fluctuate with the occasion much as does the value of a Mexican dollar in the banks of the world.

GEOGRAPHY IN NORMAL AND SECONDARY SCHOOLS

The Teachers College Record of Columbia University has recently published the following papers, the first four by Richard Elwood Dodge and the last by Clara Barbara Kirchway (Vol. XV, No. 2, March, 1914, 68 pages).

The Study of Geography in Normal Schools.

Tendencies in Secondary School Geography.

A Half Year Course in the Elements of Physical Geography and Its Applications.

Regional Geography in Secondary Schools.

Economic Geography of the United States.

PICTURE STUDY IN GEOGRAPHY

By Lucy M. Gardner

ALL teachers know the value of picture study in language but many do not realize to what extent pictures can be used in geography. By picture study in geography I do not mean the passing around or holding up of pictures in class or the putting them up on the wall for inspection. I mean thorough and thoughtful study which will not only stimulate interest in geography but arouse it in history and all branches of art, thus laying a foundation for a broader appreciation of these subjects in later years.

This work can be made just as effective in the upper as in the lower grades. Teachers of physical geography know that so far as possible every phase of it should be studied first hand. But there are many features that no one locality will illustrate and some, such as glaciers and volcanoes, that can seldom be studied by means of class field trips. The teachers, therefore, must use pictures extensively or many phases of the subject will be dry and meaningless. As long as pictures are going to supplant first hand study they should be given careful consideration by each member of the class.

There are many means for securing this. In case a class has been working for a time on rivers, when the subject has been completed, the teacher may cover a screen with numbered pictures representing such subjects as flood plains, falls, rapids, cascades, water gaps, streams littered with boulders, chasms, meandering streams, deltas and so forth. Then the class may be given a set of questions after the following manner:

What name is given to a stream like the one shown in 57?
What picture shows a young valley?
What picture shows a cut off?
Under what circumstances might the boulders shown in 28 be moved?
What one shows a water gap?
Which one illustrates cascades?
Which one shows a braided stream?

The class may be given a few days for preparing the answers and then a class period may be taken for discussing them. If a pupil gives an incorrect answer, the teacher should hand him the picture and question him until he corrects his error. In order that the pictures may be handled quickly they should be piled on the desk according to a given order, number one being on top.

Class tests by means of post cards may be given. In this exercise members of the class are given post cards showing various physical features and having on their front questions concerning the features. For instance, a card may show a valley glacier, and such questions as these may be asked:

What kind of a glacier is shown here?
What are the other types of glaciers?
In what countries are glaciers found?

Each pupil may be given a paper on which he writes the name of his picture and answers in statement form the questions concerning it. If a school has a lantern, the exercise may be managed in the following manner: the pupils may be given cards as in the exercise described above and may be asked to take down on paper the name of the feature shown and the questions concerning it. The next day the pictures may be thrown on the screen and each pupil asked to state and answer the questions concerning his picture.

Some teachers are fortunate enough to have large pictures which are furnished by the school. If such is the case, an exercise may be given in which a pupil may stand up before the class and holding his picture up so that all may see it well, point out and describe the prominent features shown there. Sometimes the plan may be varied by letting the pupil merely point to the features and then call on different members of the class to answer whatever question he chooses to ask concerning them. Still another exercise is to put up a picture and let the whole class write out what they consider a good list of questions concerning it. A few minutes may be taken for having them read and discussed.

Another exercise which pupils like, but which is adapted only for small classes is this: numbered pictures, each representing some very conspicuous feature such as a meandering stream, crevasse, moraine, artesian well, snow field, drumlin, tornado cloud, waterspout and the like, may be placed about the room. Before starting the exercise, the class may be given papers and asked to number them as for a spelling lesson. Then they may pass to the pictures and write opposite the proper number on their paper the name of the feature shown in each picture.

Pictures should figure conspicuously in the geography work of the lower grades. If a class has been studying lakes, every pupil in it may be given a picture. The pictures should show rowing, canoeing and fishing scenes, and freight and passenger steamers. After studying the picture a minute or two, each pupil may describe his. After all have had a turn, they may draw conclusions concerning the uses of lakes. This exercise may be used as early as the third grade.

A lesson on the different industries and some allied products may be worked out admirably in a similar manner. All teachers know that children often confuse products and industries. If an industry in a certain locality is called for, a child will give fruit when he should give fruit raising. Drills on the differences between products and industries may be given by means of cards or other pictures. The subjects shown in them may reveal a list after this order: a cluster of oranges, people picking fruit, a cotton boll, people at work in a cotton field, men working in the woods, piles of ore and so on. Each pupil may then tell whether his picture represents simply a product or an industry. If he says the former, the teacher may ask of what industry it is a product. Classes look upon such an exercise as a game, but teachers know from experience that a great deal is unconsciously learned.

After studying the climate and surface of any given region a class may be allowed to work out the industries from pictures. Before the teacher gets ready for the industrial lesson she should put up industrial pictures representing the locality under discussion. At odd minutes the children may list the industries and subdivide them. If they are easily confused on the distinction between industries and products, it is well to have a separate list of products made.

Pictures are invaluable in studying scenic resorts, for children have traveled little and can form no idea of natural scenery save through the medium of pictures. The late spring is the time when plans are laid for vacation trips. This season, therefore, is an excellent one for studying scenic resorts with classes and at the same time for working in a review. The plan will succeed only in the upper grades and in schools equipped with a lantern. Several weeks before the close of school the teacher may talk a bit with her pupils about vacation trips, asking where they would like to go if they could go anywhere they chose. After interest is aroused, she may suggest that each pupil in the class carefully plan a trip and present his plans, when finished, to the class by means of an illustrated talk.

The first step toward preparing such a lesson is for each pupil to hand to the teacher a slip of paper on which he has stated in brief form what he purposes to do. If several pupils select the same trip, some of them should be asked to choose others or, if possible, one may plan the main trip while others may work on side trips. For instance, some pupil may wish to go from Chicago to Los Angeles via the Sante Fe Railroad while another may describe a side trip to the Grand Canyon. After the trips are agreed upon, the teacher should post a list of available books giving information on them. Each pupil should also be provided with pictures which may be obtained from magazines, railroad folders, old geographies, picture companies and post cards. In planning his talk, he should consult folders for his route, connections and time required for the trip. He should also ascertain the cost of this trip from his local agent. When a pupil is ready to give his talk, he should notify his teacher and together they should decide upon a class hour for the presentation of the material.

Before the work is presented the pupil or pupils should hand to the teacher a bibliography of references and an outline of the talk. The English teacher is often glad to coöperate in this part of the work. The pupil should also hand in a list of pictures he intends to use. A responsible pupil may take charge of this list, and when the pictures are returned, check up the list. This arrangement will prevent the loss of pictures and will save the teacher trouble.

When the lesson is given, a map should first be thrown upon the screen. Then the pupil may point out on it the route he intends to take, the important cities he will pass through, and the roads over which he will travel. After this step, pictures of points of interest in the cities he intends to visit and of

natural scenery, may be shown and discussed. Sometimes causes for such phenomena as Yellowstone Park, Crater Lake, Natural Bridge, Niagara Falls and the Grand Canyon may be explained. After the main route has been described, the side trips may be taken up by the same pupil or other pupils.

At the close of a talk the class should feel free to criticise the discussion as to clearness, vividness and interest or the lack of these qualities. This friendly criticism will lead to improvement in later talks.

I know from experience that classes enjoy lessons of the above nature; and the work of preparing them calls for individual effort and acquaints the pupil with books of travel, while the presentation of them trains a class in talking before an audience, helps to fix locations and inspires all with a desire to travel.

Even though a detailed study of pictures is not desired, any pictures that are used by a teacher should be made the subject of some study. When those in magazines or books are used, the book should be placed on the teacher's desk and questions or comments on the pictures should either be retained on the board or on a slip of paper kept with the book.

When pictures are placed on the wall or in the blackboard tray it is well to leave them there for several days so that the scenes or objects may become fixed in the child's mind. They may often be advantageously used a second time. Naturally in studying such cities as Milan and Venice the teacher shows pictures of the cathedrals, and the pupil soon associates cathedrals with the names of these cities; but he does not gain the broad impression that beautiful churches are found all through Europe. The teacher may succeed in giving this impression if, after studying many cities such as Cologne, London, Paris, Venice, Milan, Constantinople, and Rome, she displays all together pictures of cathedrals found in these various cities.

In order that the child may do something more than merely look at pictures on the wall, slips on which points of interest concerning the pictures are written, should be pinned under them. If one has a series of pictures illustrating a given industry, they should be arranged according to the consecutive steps taken in it. The pupil should be directed to look at them in this order. In this way, he gets a clear image of the industry in as far as pictures can give one.

Although this may be a slight digression from the subject, I should like to suggest a convenient method for putting up pictures for study. A pupil can get no value from them unless he can inspect them closely. If they are put on a wall space, the upper ones are always too high for a child to see them well. If pictures from magazines are used, they are too limp to stand in a blackboard tray. Both of these difficulties may be overcome by arranging the pictures thus: With one or two patent clasps they may be fastened to white bristol board sheets which are all the same size and large enough for a

good sized picture. These can be stood up in a tray and are within reach of the smallest child. Furthermore they can be handled without any detriment to the picture. Pupils may aid the teacher in taking off the clasps or putting them on and in piling up the board and pictures.

Pictures mounted in this way are far more easily taken care of than permanently mounted ones which are bulky and hard to pack, because they vary so much in size. They also admit of a more systematic arrangement than permanently mounted ones. They may be kept filed in large envelopes, which may be obtained from a photograph gallery. If the nature of the contents is indicated on the outside, a set of pictures for a lesson may be gathered quickly. For instance, if a teacher is working on the Rockies she may go to the envelope labeled Western Mountains. If she wants material on lumbering, she can go to the one labeled American Industries. Of course every teacher will have her own means for filing. Postal cards may be arranged in packets according to contents and fastened with a rubber band.

The plans for picture study which I have outlined, may sound as though a large number of pictures were needed. Naturally every teacher knows that the more pictures a teacher has, the better equipped she is, but no teacher need be discouraged if, at the start, she has only a few pictures. These studied by pupils will prove of more value than many looked at heedlessly. If a teacher asks her friends to send her post cards showing geographical subjects instead of the ones often sent, and if she is on the alert for pictures in magazines and papers and secures illustrated railroad folders which she sees advertised, she will soon accumulate a valuable collection.

PRIMARY GEOGRAPHY AND READING

By Philip Emerson
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ONE of the best opportunities for practical geography teaching open to all primary teachers is afforded by the frequent lessons of a geographical nature found in nearly every series of school readers. It is theoretically true that primary geography should be based very largely on good study of local geography, with many field lessons. In practice, classes are too large and teachers poorly prepared to do this. But schools and teachers have from time immemorial studied books effectively: they are planned for just this. And the most essential features of any primary curriculum is reading. It occupies the most time on the daily program. Whatever opportunity it offers for the study of geography should be appreciated and full advantage taken thereof.

To make the stories of child life in various lands geographically effective the causal reasons for customs should be noted in simple form and the comparison of each new field of life with those traversed in previous lessons

should call attention to contrasts in customs between different climes and likeness in ways of living where conditions are similar, so that a sense of the larger principles of geography as to the effect of environment on life may be established, a basis for the later formal statement of such principles. This end will be inevitably secured under a teacher who understands modern geography herself, and the fundamental truths of life relations are so simple that any teacher who wishes may easily take sufficient thought to do efficient service to this end. Thought will naturally turn to the ways of home life and their explanation also as contrasts with life described in the readers awakens thought.

A lesson in reading commences with a preparatory talk whereby the teacher guides the class to gain a basis for appreciating the content of the selection as well as new words that are introduced. Any series of readers will contain stories of Eskimo life, clearly chosen because of a sense of the geographical values of the strong controls exercised on life by Arctic conditions and the appeal their novelty makes upon the children. Pictures in the book supplemented by others chosen by the teacher may present typical scenes showing the winter snow and ice, the lack of trees or bushes even when snows have melted in summer. The question as to how people can live there will bring up the thought of houses and clothing and fire, for warmth and food. It is not necessary or possible that the little folks should think out fairly and correctly many of the results of climate and consequent resources on the location and manner of human life in the Arctic. Erroneous conclusions may be recorded for the time being. Then turn to the text to find whether life there is what the children think it must be. After reading, compare fact and conjecture, and it will be clear usually where the children went astray in their thought. The result will be preparation for the reading lessons that insures interest and a true basis for geographical study continued with textbooks in later years.

With Arctic life the lessons will cover somewhat this range. The snow igloo of winter, using the material at hand and meeting the severest cold quickly; the skin tent of summer upon a bone framework, again using the materials available in the absence of woodlands. The homes along the ocean shores in winter, since the long cold drives away all life except that which, like the polar bear and Eskimo, can prey upon the seal and other sea animals. The wandering life of summer, following the wild reindeer, beside the streams where fish are abundant, or where berries and birds give variety to food. Clothing made from skins of mammals and birds, with bone needles and sinew thread, warm and soft with fur and feathers. Fire for warmth and cooking, from seal oil, carefully treasured and sparingly used. Life in general one hard struggle for food and life. The story might cover more relations and conclusions; a single lesson or group of lessons will not traverse all this suggested survey; but in part or whole it will lead the children to feel the values

of geographical conditions in affecting life and will put them in that attitude toward geographical reading lessons that means a thoughtful and more abiding interest.

In similar wise the available readers used in the first three years of most school systems will cover the life of tropical deserts, the Arab; tropical forests, the negro; the primitive life of temperate plains or forests, the Indian. They will also present a range of civilized life as it develops in a mountain land, Switzerland; on a river delta, Holland; with a strange race and history, Japan or China. With each new group of lessons the field covered in previous geographical reading lessons will of course be reviewed. When general truths are given statement in later text or teaching they will come most naturally; principles will not be mere words for use in examinations, they will be understood and used in general reading and life.

Other lessons in reading books deal with the various occupations and with the foods and fibers of most importance. Such lessons deserve similar treatment. The study of specimens from homes and stores, and the use of pictures each class may gather for itself with the teacher's help, will give needed material aid to full understanding of and interest in the stories. Each occupation may well be considered with relation to each of the various races already studied; each product, to consider how its introduction by commerce to Eskimos, negroes or other primitive peoples might affect its way of life. In conclusion, then, our primary reading books offer a wide range of lessons in human life and its environment, as presented by various typical peoples, by occupations and by commercial products. If these are not merely read but are used as occasions for thought, the reading itself will be more profitable and a sound foundation will be laid for more of real geography when maps and textbooks replace readers as a basis for the work.

METHODS OF TRANSPORTATION IN FUKIEN PROVINCE, CHINA

By Ling Hau Deng
Foochoo, China

"THE isolation of the Chinese has prevented them from joining in the great industrial revolution which is going on in western lands." Therefore their methods of transportation have been undergoing a similar slow development until the past few years. In fact, all methods of transportation in China "are primitive according to western ideas, and all are very slow and tedius." Because of great differences of climate, relief, and topography, there are many differences in the means of transportation. The southeastern provinces of China, being hilly, and temperate in climate, have a great diversity in methods of transportation, compared to those of the northwestern Chinese provinces. Let me consider especially Fukien province in some detail.

Fukien is occupied in the northwest by the Wu-I Mountains. The Min River, having its source in the northwestern part of the province, flows to the south and east, and, with its branches, serves as a good means of transportation throughout the year, never being frozen as are the rivers of northern China. The Giu-Lung River and several smaller streams serve in the same way in the southern part of Fukien. Besides these, there are canals in which small boats sail, a short railway, the backs of men, and beasts of burden, all of which serve as means of transportation.

Transportation by coolie-porter is the simplest form and the hardest labor. In the interior, away from the river, things are always carried by coolie-porters. Even in the larger towns and cities there are always many men, women, or boys, carrying heavy things through the streets, carrying their loads on their backs or on bamboo sticks. Passengers are carried in chairs. Large articles, suspended from a pole, are carried by two men; heavier things, such as iron or stone for building structures are carried by more than two men with two or three wooden poles. One can imagine how slowly such things are carried. Even though this requires such hard labor, the supply of coolie-porters and chair-coolies is still very great, because most of the people of Fukien are poor.

In a few places, passengers are also carried by horses, their speed being greater than that of the chair. Horses cost ten cents per mile while chairs cost six cents. Donkeys are occasionally used for carrying passengers; their cost and speed are about the same as those of horses.

In connection with coolie-porters, chairs, and horses, the roads should be described. They are generally bad. Radiating from the market towns are the main roads, which are made of stone, and are no more than twelve feet broad. They are not even smooth, and some of the stones are broken into small pieces. The branch roads are still worse. They are narrower and dirtier and some of them are made of clay, which becomes mud in rainy weather. Therefore neither carts nor bicycles are seen on these roads.

There are also canals in some places. For instance, heavy things such as timbers are transported by boat on a canal from Nantai through the Water Gate of Foochow City. This canal has not been improved for a long time, and so it is now just deep enough for small boats. The cost of transportation by this means is cheaper than by coolie-porters, if the things to be transported are enough to require a whole boat.

Along the banks of the Min and Giu-Lung rivers are masses of junks and small boats often densely packed together. When the wind blows in the right direction, these are propelled by sail; but if the wind does not blow in the right direction the junks as well as the small boats are propelled by oars. The junks carry heavy commodities, such as rice, salt, or timber, to sea-coast points; the smaller boats are used for passengers and inland freight. Besides these, for carrying passengers there are also, where the streams are navigable,

steamboats. They run about eight miles per hour, and cost five cents for about that distance.

Some things are transported merely by utilizing the waterways without other means of transportation; for instance, timber and bamboos are floated down the river in the form of rafts.

On the sea east of the province, steamers serve as means of transportation, to other parts of China, transporting passengers and freight. No other means of transportation found in Fukien are so convenient, safe, and fast as the steamers. Each passenger* pays seven and a half dollars from here to Shanghai, which requires a journey of thirty-six hours.

Beyond Amoy there is a railway, but—unfortunately—it is short. At first it was planned that a railway should be built from Sung-Su to Ciong-Ciu. But it failed of success with only eight miles in length constructed from Sung-Su to Geng-Dung-Gio. This was seven or eight years ago. If passengers wish to go from Amoy to Ciong-Ciu they buy a ticket for 35c from the railway company at Amoy; then they are carried by boat to Sung-Su where the railway commences; after arriving at Geng-Dung-Gio passengers are required to again take steamer, landing them at Ciong-Ciu. This is quite inconvenient for passengers, although the steamers are provided by the railway company. The railway trains run slowly and stop now and then in some places to wait for passengers, so that it takes three hours, on an average, to travel the length of the road.

The rivers should be dredged and engineering works should be undertaken to make the Foochow harbor a good one. Better roads and better steamers should be prepared, and a network of railways should be built. Then I dare say that the future of Fukien would be wonderfully prosperous.

CURRENT GEOGRAPHICAL NOTES

The Panama Canal Finished on Time

In the month of February, 1908, Colonel Goethals, the army engineer who had been placed in charge of building the Panama Canal, appeared before the Committee on Inter-oceanic Canals of the United States Senate and made the unequivocal statement that the canal could and would be finished within six years from July of that year. This period expired July 1, 1914, and the canal is finished. As a matter of fact it has been practically completed for nearly a year, except for certain auxiliary features. The date of the formal opening of the waterway for the commerce of the world remains at January 1, 1915, a date tentatively decided upon more than a year ago.

We have been told just what the opening of the Panama Canal is to mean to the commerce of the world so often that it fails to make an impres-

* All money values quoted are in Mexican value, which must be halved to give approximate value in United States currency.

sion on us any longer. Even the announcement made by a large steamship company the other day of a round-the-world tour through the Panama Canal for the early part of next year seemingly fails to arouse the imagination.

Why this apparent indifference to the actual accomplishment of an alteration in geography, to the coming true of the fancy of Balboa, and the fulfillment of the prophecy of Goethals? Is it because so much has been said and written that the subject is threadbare? Perhaps. But a better answer is that its ultimate completion, and on time, had been discounted six years ago by an abounding faith in the ability and energy of those to whom the work had been entrusted.—[*Commercial America.*]

Industries and Trade of the United States

The United States is sometimes called by German economists the land of unlimited possibilities, and when we consider the vast area, the rapidly increasing population and the enormous output of its mines, farms and factories, the truth of this statement is apparent.

The value of the products of the mines of the United States amounts to 2,000 million dollars, or 50 per cent more than the combined value of the mineral products of Great Britain and Germany. The value of the coal alone is greater than that of the output of all the gold mines of the world.

The value of the agricultural products of the United States has reached the sum of 9,000 million dollars, an amount greater than the combined value of the agricultural products of any other two nations. If all the grain fields of the United States were placed side by side there would be room enough inside of them for the whole of Germany and Great Britain. The cotton fields of the United States produce 60 per cent of the world's crop, and the value of the raw cotton exported in 1912—623 million dollars—is greater than that of any single product exported from any country.

In the value of the output of its manufacturing industries the United States has made more rapid strides than any other nation in the world. In 1850 the total value was 1,000 million dollars; in 1910 it was 21,000 million dollars, an amount more than double that of its nearest competitor—Great Britain—and greater than the value of the output of the manufacturing industries of Great Britain and Germany combined.

The growth of the foreign trade of the United States serves as an index of its marvellous economic expansion. Up to 1876, like most new countries, the United States imported more than it exported. Only three times prior to that date did the exports exceed the imports. Since that date there have been only three years in which the United States did not sell more than it bought.

In 1880, 55 per cent of the exports consisted of food-stuffs, while in 1912 only 19 per cent consisted of this class of products. The rapidly increasing population of the country employed in non-agricultural industries caused an increased consumption of products of the farm. In the mean-

time the factories of the country turned out more products than could be consumed at home. This surplus of manufactured products was sold abroad and more than made up the decrease in the percentage of the exports of foodstuffs. The future prosperity of the United States will depend upon our ability to export our surplus manufactured products, for if we do not do so hundreds of our mills and factories will be closed and millions of our workmen reduced to poverty and our American standard of living reduced to the European level.

In 1880 manufactured products represented only 15 per cent of the exports. In 1912 they amounted to 1,100 million dollars, or nearly 50 per cent, and today in certain classes of manufactured products we compete with Germany and other foreign countries.

So long as our exports consisted of raw cotton, foodstuffs and products of the fields and mines, there was no need of what is called industrial education, and now, as far as a large part of our manufactured products is concerned, industrial education would be of very little value, but there is a steadily increasing demand for more highly manufactured products which makes industrial education a necessity.

Although the United States is still behind Great Britain and Germany in the value of the exports of manufactured products, it is increasing the export of this class of goods at a much more rapid rate than either of them. An examination of the character of these products shows that 60 per cent is made up of partly manufactured products, or of such products as refined oil and copper, in which Great Britain and Germany do not compete. The remaining 40 per cent is made up of more highly manufactured products and, with the possible exception of machinery, mainly of such classes of articles as can be made in large quantities at a low rate.—[J. J. MacFarlane in *Commercial America.*]

Cotton Is King

In looking over the preliminary figures of the exports of the United States for the fiscal year ended with June 30, 1914, just made public by the Department of Commerce, record-breaking exports of raw cotton stand out prominently in a period marked by general declines. The value of the exports of this staple for the year was 610 million dollars.

This high record was due, however, to the higher prices realized rather than to the quantity exported. The number of bales sent out of the country in the fiscal year just over was 9,165,000, or 1,500,000 less than the record quantity of 1912. But the average export price per pound in the fiscal year 1914 was 12.8 cents as against 10.2 cents in 1912.

The United Kingdom and Germany took more than two-thirds of the cotton exported from the United States in the fiscal year 1914, the total to the United Kingdom having been 3,452,000 bales, valued at 232 million dollars, and that to Germany, 2,785,000 bales, valued at 182 million dollars.

Over one million bales valued at 74 million dollars went to France. Shipments varying in amount from 517,000 to 102,000 bales were made to Italy, Japan, Spain, Belgium, Canada and Austria Hungary. This country also sent 95,000 bales to Russia, besides large indirect shipments credited to intermediate countries. European countries as a whole took 8,638,000 bales, or 94.3 per cent of the total American exports; Japan, Canada and Mexico, 516,000 bales, or 5.6 per cent, and the rest of the world, only 11,000 bales, about one-tenth of one per cent of the total.

The value of the exports of raw cotton from the United States has more than doubled in the last twelve years. In 1902, the total was 291 million dollars, and in 1914, as already stated, 610 million. About two-thirds of the domestic production of this great staple is now exported. The number of bales reported by the Bureau of the Census as being ginned in the cotton year was 13,965,000, and the exports for the fiscal year, as already referred to, were 9,165,000 bales.

These figures prove beyond a shadow of doubt the right of cotton to be called king of American exports. More than that, they suggest that there is no danger in the immediate future of its being dethroned. Countries in which cotton spinning is an important industry are making every effort to increase the cultivation of this staple, either within the national boundaries or in the colonies and dependencies. These efforts are meeting with some success, particularly in Russia, India and Egypt. But it would seem nature had endowed the southern part of the United States with conditions of soil and climate so well suited for the cultivation of the cotton plant, that efforts for its successful growth on a large scale in other parts of the world must labor under a certain handicap.

It may be that the exports of this staple from the United States will fall off in future years,* or remain stationary. If such should be the case the reason will be found probably, not in the competition of other cotton producing sections nor in a falling off in the demand for the American product by the spinners of other countries, but in the larger demands of an increasing cotton manufacturing industry in the United States. That country derives the greatest benefit from its export trade which ships its products abroad in the highest possible manufactured form.—[*Commercial America.*]

COTTON AND THE WAR

Editor's Note. *This review was written before Great Britain, France, Germany, Belgium, Austria Hungary, Russia, and other European countries went to war in the summer of 1914 and the market for 7 or 8 million bales of American cotton was cut off. Suggestions that the United States government take up the valorization of cotton, as Brazil did with her coffee crop some years ago, have met with little favor. The buy-a-bale-of-cotton movement is not widespread, and the cotton raising industry of this country faces a crisis, with no very promising prospect for 1915.